

Remarks

The above amendments and these remarks are responsive to the Office action mailed November 14, 2005. With entry of this amendment, claims 1-21 are pending. In the Office action, the Examiner rejected claims 16 – 21 under 35 U.S.C. 112; rejected claims 7 and 10 – 15 under 35 U.S.C 102(e) as being anticipated by Ueda et al. (U.S. Patent 6,892,527); rejected claims 8 and 9 under 35 U.S.C. 103(a) as being unpatentable over Ueda et al. as applied to claim 7, in view of Bolz et al. (U.S. Patent 6,510,685); rejected claims 1 and 3 – 5 under 35 U.S.C. 103(a) as being unpatentable over Freisinger et al. (U.S. Patent 6,729,120); rejected claim 2 under 35 U.S.C. 103(a) as being unpatentable over Freisinger et al. (U.S. Patent 6,729,120) as applied to claim 1, in view of Bolz et al. (U.S. Patent 6,510,685); and objected to claim 6 as being dependent upon a rejected base claim. In this response, applicants have amended claims 1, 5, 16, 17 and 19; canceled claims 6 – 15; and added new claim 22.

Applicants thank the Examiner for carefully considering the subject application.

Prior Art

The Information Disclosure Statement (IDS) filed on December 2, 2003 was not considered because the pages in the IDS that contain a listing of the cited references were missing. Applicants submit herewith a complete IDS.

Background

Before turning to the details of the Office action, Applicants believe it may be helpful to review some background information. As described in Applicants' Background and Summary (¶¶ 2 – 6, for example), the performance of emission control devices typically degrade over time.

One reason for this is an accumulation of sulfate, derived from the combustion of fuel sulfur, which effectively competes with the nitrate for storage space. Applicants further recognize the degradation in performance of an emission control device can be from a loss in activity of the catalyst used to form the solid nitrate. For example, if the catalyst is platinum supported on a high-surface-area oxide, its loss in activity can result from loss of platinum surface area due to coarsening of the supported particles of platinum. Unfortunately, known approaches for device regeneration, such as sulfur removal approaches, may not restore the platinum surface area.

Applicants have addressed the issue through various approaches, such as the example approach outlined in amended claim 1, which claims:

A method for controlling engine operation in a vehicle, the engine coupled to an emission control device including at least platinum particles for converting emissions from the engine, the method comprising:

detecting a deceleration condition of the vehicle;

in response to said deceleration condition, having combustion in at least one cylinder, and adjusting fuel injection into the engine to maintain an exhaust mixture air-fuel ratio entering the emission control device to be lean, but less lean than a limit air-fuel ratio value, said limit air-fuel ratio value being a lean air-fuel ratio limit determined as a function of exhaust temperature.

Since Applicants herein have observed that particle coarsening occurs based on various combinations of a lean exhaust air-fuel ratio above a given catalyst temperature, it is possible to use the emission control device in this way to reduce platinum-particle coarsening, thus providing for robust emission control.

Claim 1

Now turning to the Office action, it applies Freisinger under 35 U.S.C. § 103 to claim 1.

Applicants respectfully disagree.

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First, Applicants can find no disclosure of adjusting fuel injection into the engine to maintain an exhaust mixture air-fuel ratio entering the emission control device to be lean, but less lean than a limit air-fuel ratio value, where the limit air-fuel ratio value is a lean air-fuel ratio limit determined as a function of exhaust temperature. The Office action points to step A2 of Freisinger at page. 5. However step A2 merely compares temperatures, with no disclosure of a lean limit air-fuel ratio value determined as a function of exhaust temperature.

Second, Applicants can also find no disclosure of “adjusting fuel injection into the engine to maintain an exhaust mixture air-fuel ratio entering the emission control device to be lean, but less lean than a limit air-fuel ratio value.” Rather, Freisinger switches off the engine in an idling and/or overrun mode depending on the temperature of the catalytic converter. Feisinger fails to show maintaining air-fuel ratio, let alone maintaining it in a lean state.

Third, Applicants have amended independent claim 1 to state “in response to said deceleration condition, having combustion in at least one cylinder, and adjusting fuel injection into the engine to maintain an exhaust mixture air-fuel ratio entering the emission control device to be lean, but less lean than a limit air-fuel ratio value, said limit air-fuel ratio value being a lean air-fuel ratio limit determined as a function of exhaust temperature.” Applicants respectfully submit that, as noted above, Feisinger fails to show maintaining a lean exhaust gas with combustion, where the lean air-fuel ratio is limited as a function of exhaust temperature. Rather, Freisinger turns off the engine during idling and/or overrun mode. Not only is fuel not injected, but it is disclosed that the ignition is turned off. See Col. 4, lines 41-49. As such, Applicants respectfully submit that there is no disclosure of performing combustion under such conditions.

Finally, Applicants object to the assertion that it is notoriously well known to those with ordinary skill in the art that a typical emission control device includes platinum particles and thus the cited reference is improperly applied.

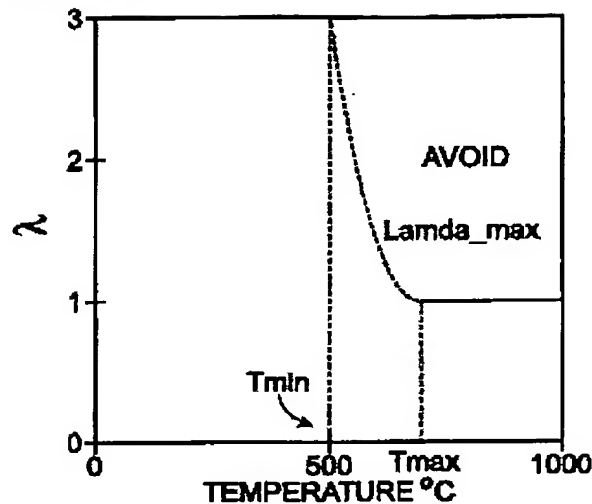
Applicants therefore respectfully request the rejection under 35 U.S.C. be §103 withdrawn.

Claim 3

The Office action applies Freisinger under 35 U.S.C. §103 to claims 3. As discussed above, Freisinger fails to disclose various limitations of independent claim 1 from which claim 3 depends. As such, the rejection of this claim should also be withdrawn.

In addition, Applicants respectfully disagree with the application of Freisinger to claim 3. Specifically, Applicants can find nothing in Freisinger that shows a limiting lean air-fuel ratio value that decreases as temperature increases. Applicants have recognized that an emission control device can become more sensitive to temperature as the air-fuel ratio becomes leaner (shown in Fig. 4A of the application, reproduced below). Thus, Applicants submit that it can be desirable in a deceleration state, to maintain the air-fuel ratio entering an emission control device in a lean condition, but less lean than a limiting value that decreases as temperature increases.

Fig. 4A



Applicants have reviewed Freisinger and can find nothing relating to maintaining an exhaust mixture air-fuel ratio entering the emission control device to be lean, but less lean than a limit air-fuel ratio value, said limit air-fuel ratio value being a lean air-fuel ratio limit determined as a function of exhaust temperature. As such, Applicants respectfully request that the rejection under 35 U.S.C. §103 withdrawn for at least the reasons described above.

Claims 16 – 21

Applicants have amended claims 16, 17, and 19 to particularly point to a second emission control device. As such, the rejection under 35 U.S.C. §112 should be withdrawn.

Claim 22

The Examiner has indicated that claim 6 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants

have added new independent claim 22 which includes the limitations of claim 6 and includes all of the limitations of the base claim and any intervening claims.

Based on the foregoing comments, the above-identified application is believed to be in condition for allowance, and such allowance is courteously solicited. If any further amendment is necessary to advance prosecution and place this case in allowable condition, the Examiner is courteously requested to contact the undersigned by fax or telephone at the number listed below.


Please charge any cost incurred in the filing of this Amendment, along with any other costs, to Deposit Account No. 06-1510. If there are insufficient funds in this account, please charge the fees to Deposit Account No. 06-1505.

CERTIFICATE OF FACSIMILE

I hereby certify that this correspondence is being sent to the United States Patent and Trademark Office via facsimile at (571) 273-8300 on February 8, 2006.


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